APPENDIX B
BUTLER'S GARTERSNAKE CONSERVATION PLAN FOR THE SPENCER'S PASS RESIDENTIAL DEVELOPMENT

BUTLER'S GARTERSNAKE HABITAT RESTORATION & MANAGEMENT PLAN

CEDARBURG SCIENCE, LLC PROJECT # WRB-0217-05-01

The Spencer's Pass Subdivision is a residential development proposed for two agricultural parcels. Suitable habitat for the state-threatened Butler's Gartersnake has been identified on-site by the Wisconsin Department of Natural Resources (WDNR). Approximately 3.5 acres of habitat will be impacted by the development—1.0 acre of habitat is proposed to be directly impacted by the development of a road and stormwater detention basins, and approximately 2.5 acres of habitat is to be isolated from other snake habitat (and therefore effectively lost) by road development (Figure 2). To mitigate for this loss, approximately 8 acres of habitat (termed 'Preserved Areas' in this report) will be created, restored, and/ or managed in perpetuity in a conservation easement. Of this, approximately 4.3 acres will be created as new suitable snake habitat (New Snake Habitat), approximately 2.4 acres of habitat will be restored (Enhanced Habitat), and approximately 1.3 acres of habitat will be managed for woody invasive species (Managed Habitat; Figure B1). This restoration and management plan includes guidance for restoring and managing the vegetation in the Preserve Areas.

The Preserve Areas largely consist of fallow agricultural land, although a drainageway divides the western New Snake Habitat in two. The agricultural land has lay fallow for approximately one year and is dominated by a variety of weedy annual species. The drainageway contains low quality habitat as it is dominated by the invasive reed canary grass. North of these areas is a riverine fresh (wet) meadow wetland associated with the Fox River. Active agricultural land occurs to the east and west of the Preserve Areas and the proposed development occurs to the south.

There are three defined areas for which this plan outlines restoration and management measures to be conducted. These areas include: (1) the Enhanced Habitat; (2) the New Snake Habitat; and (3) the Managed Habitat.

RESTORATION AND MANAGEMENT RECOMMENDATIONS

With respect to the goal of restoring and managing the subject site for Butler's Gartersnake habitat, a multi-faceted approach is recommended. The components of the recommended plan are: 1) revegetation within the temporarily disturbed Enhanced Habitat; 2) habitat creation within the New Snake Habitat; 3) invasive woody species control within the Managed Habitat; and 4) follow-up monitoring and maintenance.

Planting Plan

The recommended planting plan involves seeding both the New Snake Habitat and the Enhanced Habitat with a native prairie grass seed mix (Table 1; Figure B1). This native mix contains species that occur naturally and thrive with minimal to no long-term management. The seeding areas should be planted with the appropriate seed mix at a rate of 7.0 pounds pure live seed (PLS) per acre; *Carex vulpinoidea* should be seeded only in the wetter areas of the habitats, as determined by an ecologist. The origin of all seed shall be of local genotype (from within a 100-mile radius of the subject site if possible).

Table 1. Recommended Prairie Grass Seed Mix*.

Scientific Name	Common Name
Bouteloua curtipendula	side oats grama
Carex vulpinoidea	brown fox sedge
Elymus canadensis	Canada wild rye
Schizachyrium scoparium *Festuca obtusa (subverticillata)*	little bluestem fescue

* If any of these species are unavailable by the nursery, consult with Cedarburg Science and Bob Hay at WDNR for appropriate substitutions.

These plantings will occur in Spring or Fall 2005, depending upon when grading activities are completed. All seeding efforts should be completed no later than November 15, 2005. No seeding should occur between July 1, 2005 and October 15, 2005.

The seedbed should be prepared properly to insure an adequate planting bed for the native seed. The following steps should be followed:

- A depth of at least 6 inches of organic topsoil should be verified prior to seeding. If areas are found to contain less than the minimum requirement, additional topsoil should be placed over those areas.

- In the areas that are currently fallow agricultural land (i.e., New Snake Habitat), one to two herbicide treatments with a general glyphosate herbicide such as Roundup should be made in order to rid the area of weeds.
- Prior to seeding, the top 4-6 inches of the soil surface should be disked to loosen the soil, break up soil clods, and provide a uniform texture to the soil. All medium to large cobble (greater than 1 inch) and woody debris should be removed from the seeding areas.
- Seeding should occur immediately following the seedbed preparation.

The seed mix should be mixed with moist sand or sawdust at a 10:1 ratio (10 parts sand or sawdust to 1 part seed) to obtain an even distribution of the seed and help to hold it in place. The seed can be mechanically or hand-broadcast and raked lightly (using a leaf rake, or equivalent) to ensure even distribution of the seed and good soil-to-seed contact. However, the seed should not be raked into the soil deeper than ½-inch from the soil surface. Seed should be sown when rain is forecast within 24 hours of the seeding to aid in providing soil-to-seed contact. If not, watering should be considered immediately following the seed application.

In addition to the proper seed mixes, a cover crop shall also be mechanically or hand-broadcast over the entire seeding areas at a rate of 30.0 pounds per acre. Annual oats (*Avena sativa*) should be used as the cover crop if the site is seeded prior to September 15, 2004. If the seeding occurs after September 15, 2004, winter wheat (*Triticum aestivum*) should be seeded.

The seeded areas should then be covered with erosion control materials—clean straw mulch should be used in areas of gradual grade (greater than 1:6 slopes) and a wildlife-friendly erosion control blanket (such as North American Green products S75BN or S150BN) should be used on slopes with a grade less than 1:6. It is very important that the contractor use clean mulch free of any weed seeds. Any germinating weed seeds (such as Canada thistle) within the straw mulch could out-compete the target species that are planted thus reducing the germination rate of the seeded species. This reduced germination rate would be an indicator of a failed restoration.

Initial Management of Seeded Areas in the Preserve Areas

A crucial component to preserving the subject site involves invasive species control during the first few growing seasons. Annual weeds will likely be the first plants to appear. The New

Snake Habitat and Enhanced Habitat should be mowed with a flail or sickle to cut weeds off before they set seed (late spring - summer). The following steps should be taken in order to minimize snake mortality from mowing:

1) Mowing should be done in a patch rotation, with no more than 33% of the available grassland habitat affected in any one year. Since the available grassland habitat extends well beyond the managed area where mowing may be performed, it is likely that the entire managed area may be mowed (where necessary) in any given year. Cedarburg Science, or another qualified restoration ecologist should determine where mowing may be beneficial for weed control each year, and follow the below snake guidelines when used.
2) Mowing should be performed when weather conditions are most likely to avoid snake activity (during the hottest period of the day when sunny conditions prevail and air temperatures exceed 80º F, or on very cool, overcast days when temperatures are below 50º F.
3) Mower blades should be set at a minimum of 10 inches off the ground, since grasses maintained under 8 inches are less likely to provide useful habitat for this species.

Other control measures, such as herbicide applications, may be needed if mowing does not sufficiently reduce weed coverage. The type and amount of control needed should be determined by Cedarburg Science, or another qualified ecologist, during the annual monitoring, but must comply with the Butlers gartersnake management protocols. As the native grasses grow and spread, thereby reducing the amount of bare soil, weeds should decline significantly.

Fire management is the best method for long term management. It usually takes two-to-three years before enough fuel accumulates to sustain a fire. Burn the plantings as soon as fuel conditions allow, using the directions that follow. If burning is not feasible, mow the plantings each year as described above for the first three years to prevent weed spread and keep the seed bed open to sunlight. After the third year, mowing should only be performed in order to address a weed problem in a specific area, as determined by a qualified ecologist. During the burning/mowing management, alternate seasons when you burn or mow to mimic a natural disturbance regime. This also improves seedling establishment. After several years, the planted areas should be able to manage themselves with an occasional burn or mow every 2-3 years to control weeds and keep the area open to sunlight.

Prescribed burning should be performed within the Butler's Gartersnake habitat only during the hibernation period, which generally runs from November 1 through late March. Warm temperatures in the early spring encourage early snake emergence and warm temperatures in late fall can delay the onset of hibernation; conversely, cool weather can shorten activity periods for snakes in both spring and fall. Therefore, seasonal variations should be considered when making a determination as to whether or not to burn in mid-to-late March or in early November. The following information should be used to determine when burns outside of the recommended window are acceptable:

Spring: If daytime highs have been regularly below 50º F and/or frost is still evident in the ground, burns in early April may be conducted. To check for frost, insert a metal probe in several places at the wetland/upland interface (just outside the ordinary high water mark, but not in the wetland).

Fall: If daytime highs have been regularly below 50º F for several consecutive days and the day of the burn has similar temperatures (high in 40's) burns may be conducted in October.

Invasive Species Management in the Preserved Areas

Invasive species management is also vital to preserving and managing Butler's Gartersnake habitat in the Preserved Areas. Invasive species to be targeted for control include *Lonicera* spp. (bush honeysuckle), *Rhamnus cathartica* (common buckthorn) and *Rosa multiflora* (multiflora rose). It should be noted that many of the management techniques described below are based on guidance provided by the Wisconsin Department of Natural Resources (*Wisconsin Manual of Control Recommendations for Ecologically Invasive Plants*, published in May 1997).

Bush Honeysuckle, Common Buckthorn, and Multiflora Rose Management

Common buckthorn, multiflora rose, and bush honeysuckle shrubs are scattered throughout the drainageway in the Preserved Areas. These species are to be removed from the drainageway in fall 2005 - early spring 2006. A professional experienced in identifying these species during the dormant season should locate and mark individual shrubs immediately prior to any cutting activities. While there are several techniques available for controlling these targeted invasive species, we recommend the methods described below as they have been found to be the most effective.

The buckthorn, honeysuckle, and multiflora rose shrubs are to be cut at a height no greater than three inches from the ground surface. The cut stumps are to be immediately treated with a 30% active ingredient solution of triclopyr that is formulated for oil dilution (e.g. Garlon IV). It is important that the herbicide be applied with a small brush or wick applicator to each cut stump within 30 seconds following the cutting of the stump. If more than 30 seconds pass, the stump should be re-cut followed by immediate application of the herbicide. A small brush, sponge applicator, or wick applicator is required to maintain control of the herbicide application and prevent splashing on adjacent vegetation. Spray applicators should not be used for applying herbicide to the stumps.

All shrub cutting and herbicide application should be performed when the air temperature is above freezing (preferably above 40° F). All cut woody vegetation is to be removed from the site and properly disposed of off-site by the contractor.

All remaining stumps are to be left intact and not grubbed out. This will minimize damage to the surface soil and established vegetation. More importantly, as these stumps begin to decompose, they may provide suitable subsurface cavities for Butler's Gartersnake hibernation.

Follow-up Monitoring and Maintenance

Success of the restoration efforts outlined above can only be measured by conducting follow-up monitoring. Restoration and habitat management success will be based on seed germination and success of the invasive species control.

Monitoring Planted Areas

The seeded areas should be monitored annually for 5 years, and a brief letter report should be submitted annually to the Homeowners' Association and the WDNR. Monitoring should occur between June 1 and September 1, although monitoring during the first growing season following the restoration (i.e. 2006) should occur no earlier than July 1, 2006 to allow adequate time for the seeded vegetation to germinate.

Extensive vegetation monitoring is not essential during the annual monitoring; however, some limited quantitative monitoring should be employed to ensure that the plantings did not fail. The

quantitative sampling should yield two parameters: percent cover of represented species and species composition of the seeded areas.

A primary goal of this project is to restore the disturbed areas to a community dominated by native vegetation. The goal of the seeding is therefore to have at least an 80% germination rate of the seeded plant species. This may be difficult to achieve because the seeding area currently contains and is surrounded by, many aggressive, invasive herbaceous species such as Kentucky blue grass and reed canary grass. Kentucky blue grass and reed canary grass are utilized to some extent by Butler's Gartersnakes, however, so the presence of these species should not compromise habitat suitability unless they become dominant and reduce the overall structural diversity of the ground flora community. As such, if it is determined that an 80% germination rate of the seeded species has not been achieved at the end of the 5-year monitoring period, further assessment of the area should be made to determine whether or not suitable Butler Gartersnake habitat has been re-established.

Long Term Management Guidance for Butler's Gartersnake Habitat

(This guidance may be periodically updated by the Wisconsin Department of Natural Resources)

Periodic maintenance is needed for maintaining native wetland, grassland, prairie, or savanna ecosystems as suitable habitat for Butler's Gartersnakes. The management objective is to maintain good ground cover of native grasses and other herbaceous plants, which provide cover for snakes. These plants require relatively open canopy conditions for sufficient sunshine. Therefore, periodic control of excessive growth of woody shrubs and trees must be performed. While such woody growth is in part a natural succession, such open communities were maintained naturally by grazing and fire. In addition, several invasive species can compromise habitat quality, and should not be allowed to form large stands (i.e. reed canary grass, cattail, giant reed grass). These guidelines are meant for maintaining already good quality habitat, rather than as a plan for eradication of large stands of invasive species. If there are major invasive species problems on site, a qualified restoration ecologist should be consulted.

For general maintenance and control of woody vegetation, any of the following methods may be used on a rotation of once every 3-5 years:

1. Selective Brush/Tree-Cutting: This is the preferred method for small scale, general maintenance. Selective cutting (i.e. chain saw) may be done without restriction. Herbiciding of cut stems immediately after cutting is recommended as per label instructions (i.e. glyphosate, see also DNR guidelines for herbicide use online).
2. Burning:
    a. If burning will be done between November 6 and March 15, there are no restrictions.
    b. If burning will be done between March 16 and November 5, then only up to 25% of the available grassland habitat for that site should be burned in any one year.
3. Mowing/Haying: Herbaceous mowing and brush-mowing should be done as follows:
    a. If mowing will be done between November 6 and March 15, there are no restrictions (for brush, this time frame is generally feasible).
    b. If mowing needs to be performed between March 16 and November 5 in order to address a specific weed problem (as determined by Cedarburg Science or another qualified ecologist), then:
        i. Conduct mowing in small patches in a rotational pattern, with no more than 33% of the available grassland habitat on the site affected in any one year.
        ii. Mower blades should be set a minimum of 8 inches off the ground.
        iii. Conduct when weather conditions are most likely to avoid snake activity:
            1. During the hottest period of the day when sunny conditions prevail and air temperatures exceed 80° F, OR
            2. On very cool, overcast days when temperatures are below 50° F
4. Grazing: Light-to-moderate grazing (<1.0 head per acre) may be used in rotations among habitat patches, with no more than 33% of the available habitat on the site grazed in any one year. Grazing should be discontinued in a patch as soon as 50% of the grasses and forbs in a grazed patch are cropped to 8 inches in height.